

See Project 758

For all other Docs

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Including Cert. 'C-LSH08-1571D.'

See AE 758-4

DCLs

ICA

Apine.

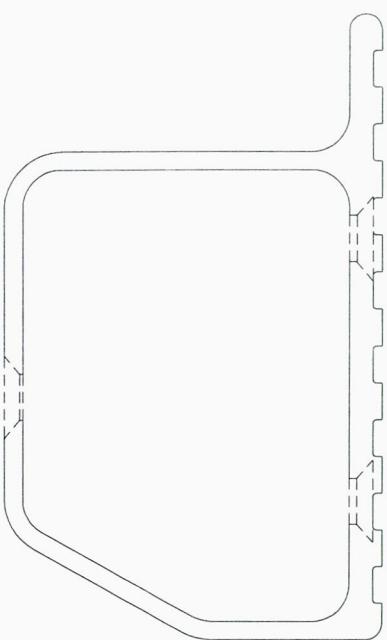
Pbt/AME.

Mike Leguesne

(h) 403.609.7964

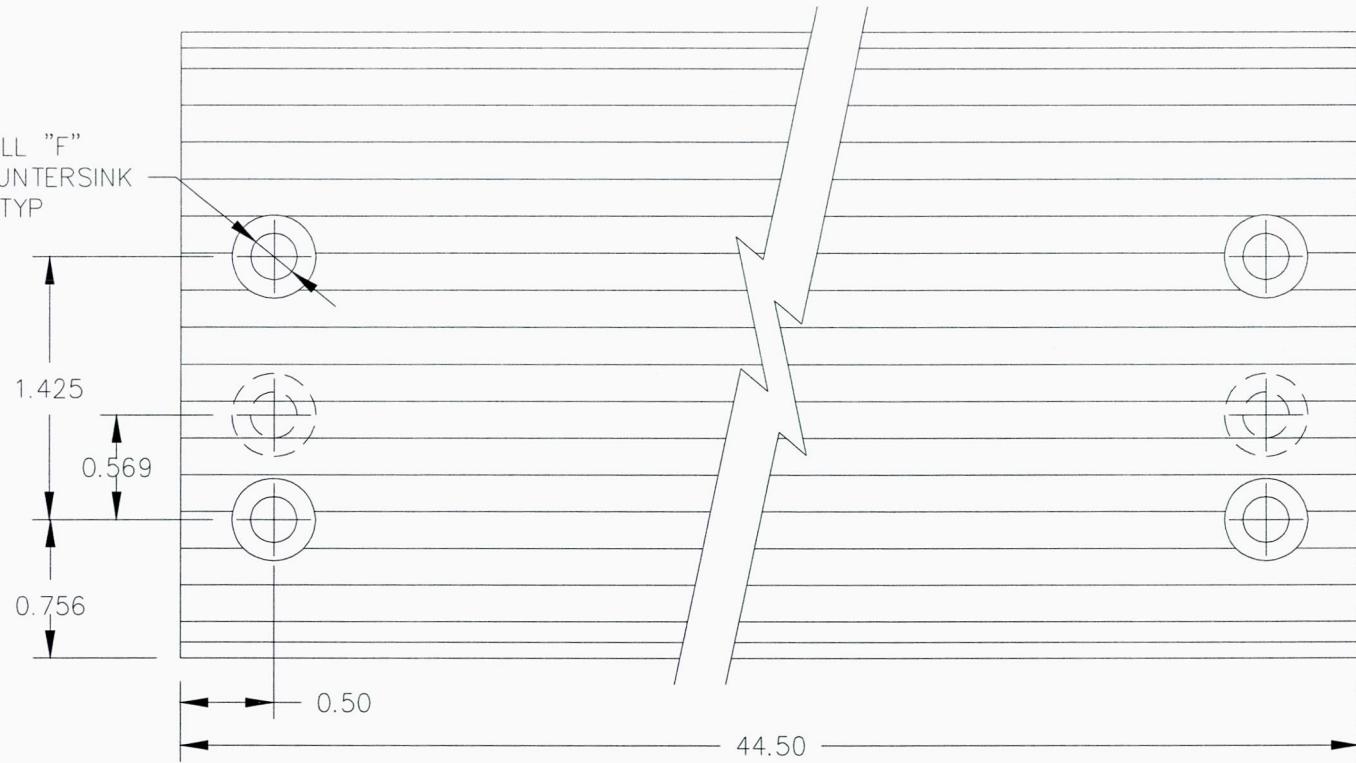
(c) 403.815.5968

REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL RELEASE		07/05/08



## NOTES

1. REMOVE ALL BURRS AND BREAK SHARP EDGES.
2. DEGREASE, ALODINE AND PRIME PRIOR TO ASSEMBLY.



1	79832-01	01	STEP	78230 STEP EXTRUSION
01	PART NO.	ITEM	DESCRIPTION	MATERIAL
QTY	LIST OF MATERIALS			

## LIST OF MATERIALS

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APPROVALS	DATE
WN: R. RATHWELL	07/05/08
CKED: E. BURGOIN	
UNLESS OTHERWISE SPECIFIED	
DIMENSIONS ARE IN INCHES.	
TOLERANCES ON:	
DECIMALS	ANGLES
X.XXX	$\pm 0.010$
X.XX	$\pm 0.03$
X.X	$\pm 0.1$

AERO DESIGN LTD.

CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M  
2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7  
tel: (403) 250-8027 fax: (403) 250-8333 [www.aerodesign.ca](http://www.aerodesign.ca)

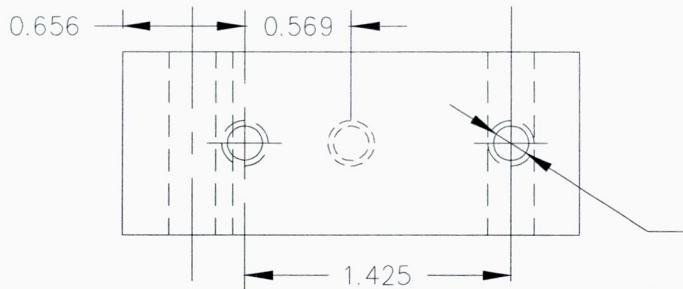
BELL 212/412/205A-1/205B  
RAPPEL STEP  
STEP

SCALE 1 : 1	DWG. SIZE	DWG. NO.	REV.	
SHEET 1 OF 1	A4	79830	0	

REV.	
0	

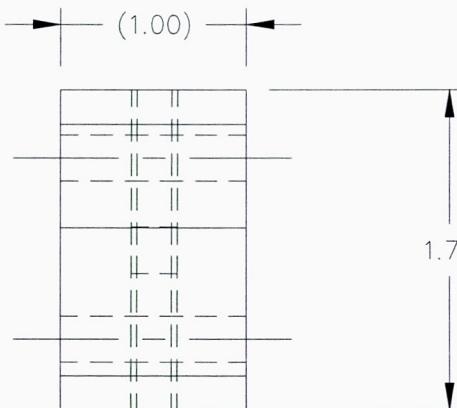
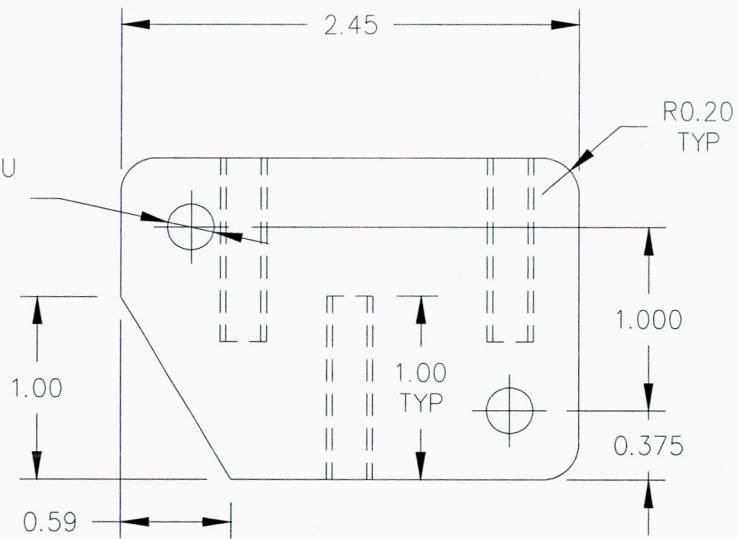
### DESCRIPTION OF CHANGE

INITIALS	DATE
*	*



DRILL #21 (.159) T 1.00  
TAP 10-32  
TYP 3 PLACES

DRILL #3 (.2130) THRU  
TAP 1/4 - 28  
TYP 2 PLACES



## NOTES

1. REMOVE ALL BURRS AND BREAK SHARP EDGES.
2. DEGREASE AND ALODINE PRIOR TO ASSEMBLY.

1	79833-01	01	BLOCK	6061-T651 ALUM PLATE	AMS-QQ-A-250/11	T=1.0
01	PART NO.	ITEM	DESCRIPTION	MATERIAL	MATERIAL SPEC	STOCK SIZE
QTY				LIST OF MATERIALS		

## LIST OF MATERIALS

AERO DESIGN LTD.

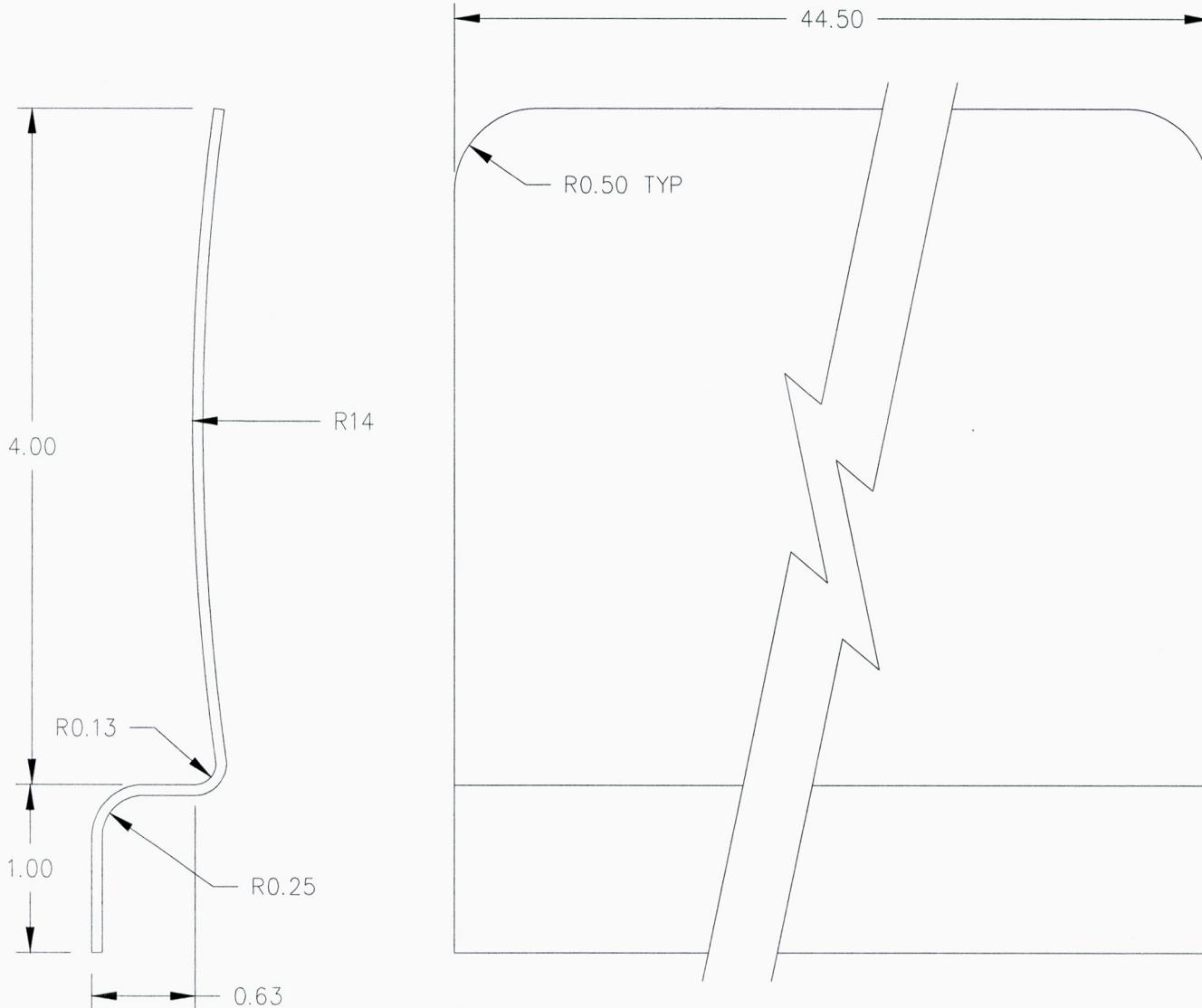
CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M  
2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7  
tel: (403) 250-8027 fax: (403) 250-8333 [www.aerodesign.ca](http://www.aerodesign.ca)

BELL 212/412/205A-1/205B  
RAPPEL STEP  
BLOCK

APPROVALS		DATE	<p style="text-align: center;"><b>AERO DESIGN LTD.</b></p> <p>CONSULTING ENGINEERS, TRANSPORT CANADA APPROVALS, DAR 290M  2013 - 39TH AVENUE N.E., CALGARY, ALBERTA, CANADA, T2E 6R7  tel: (403) 250-8027 fax: (403) 250-8333 <a href="http://www.aerodesign.ca">www.aerodesign.ca</a></p>										
DRAWN: R. RATHWELL		07/05/08											
CHECKED: E. BURGOIN													
<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:</p> <table> <tr> <td>DECIMALS</td> <td>ANGLES</td> </tr> <tr> <td>X.XXX <math>\pm 0.010</math></td> <td><math>\pm 1/2^\circ</math></td> </tr> <tr> <td>X.XX <math>\pm 0.03</math></td> <td></td> </tr> <tr> <td>X.X <math>\pm 0.1</math></td> <td></td> </tr> </table>		DECIMALS	ANGLES	X.XXX $\pm 0.010$	$\pm 1/2^\circ$	X.XX $\pm 0.03$		X.X $\pm 0.1$			<p style="text-align: center;">BELL 212/412/205A-1/205B RAPPEL STEP BLOCK</p>		
DECIMALS	ANGLES												
X.XXX $\pm 0.010$	$\pm 1/2^\circ$												
X.XX $\pm 0.03$													
X.X $\pm 0.1$													
		SCALE 1 : 1	DWG. SIZE	DWG. NO.	REV.								
			A4	79833	0								
		SHEET 1 OF 1											
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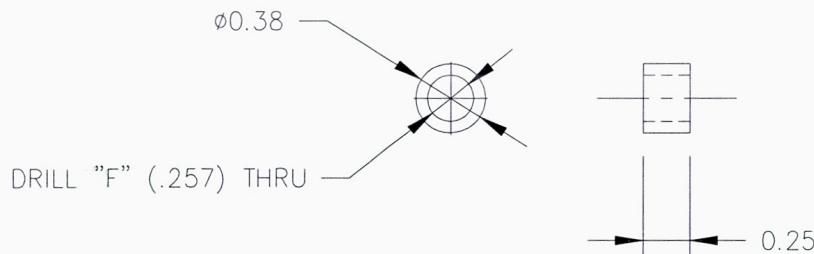
REV.	DESCRIPTION OF CHANGE		INITIALS	DATE
	O	INITIAL ISSUE		



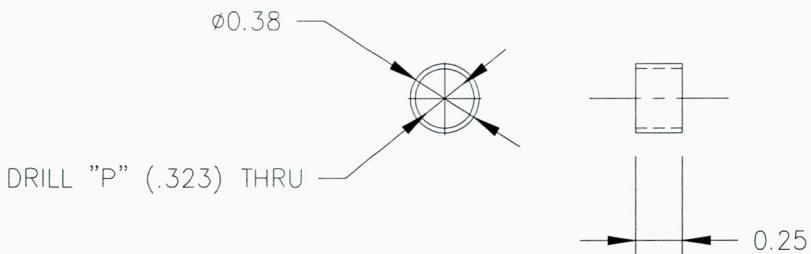
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REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE		



## 01 BUSHING



## 02 BUSHING

## NOTES

## 1. REMOVE ALL BURRS AND BREAK SHARP EDGES.

APPLICANT: AERO Design Ltd.  
2013 - 39th Ave N.E.  
Calgary, Alberta  
T2E 6R7

CORRESPONDANCE TO: AERO Design Ltd.  
(If other than applicant) 2013 - 39th Ave N.E.  
Calgary, Alberta  
T2E 6R7

DATE: 07 May, 2008  
REV. No. 0

MAKE: Bell Helicopter  
MODEL: 212, 412, 205A-1, 205B

REGISTRATION:  
SERIAL No.:

NATURE OF WORK: Rappel Step installed on Helicopter Hardpoints

MODEL CERTIFICATION BASIS: FAR 29, at amendment 29-2

MODIFICATION CERTIFICATION BASIS: FAR 29, at amendment 29-2

Airworthiness Requirement	Subject for Compliance or Documentary Proof	Form of Substantiation	DOT	DAR	Comments
<b>Subpart B</b>	<b>Flight</b>				
29.29	Empty Weight & Corresponding CG	Installation Drawing			
29.45 –	Performance	N/A - Not Significant			
29.79					
29.141 –	Flight Characteristics	N/A - Not Significant			
29.241					
29.251	Vibration	Flight Test	X		TP798.02 Flight
<b>Subpart C</b>	<b>Structure</b>				
29.301	Loads - Personnel	Engineering Report	X		Design loads appropriate to function are used.
29.301	Loads – Air	N/A			The step has a small surface area.
29.303	Factor of Safety	Engineering Report	X		
29.305	Strength and Deformation	Engineering Report	X		
29.307	Proof of Structure	Engineering Report	X		
29.337	Manouevring Load Factor	N/A			Rappeler is attached to a belay line, which supports the majority of his weight. Helicopter is normally in a hover at this time. The step is an aid to stepping down to the landing gear tube.
<b>Subpart D</b>	<b>Design &amp; Construction</b>				
29.601	Design	N/A			
29.603	Materials	Engineering Report	X		
29.605	Fabrication Methods	Fabrication Drawing	X		There are no unusual features on this installation.

Airworthiness Requirement	Subject for Compliance or Documentary Proof	Form of Substantiation	DOT	DAR	Comments
29.609	Protection of Structure	Fabrication Drawing		X	
29.613	Material Strength Properties & Design Values	Fabrication Drawing		X	

*L5H08-1571D*  
**AERO** Design Ltd.

*Signed*

## FLIGHT TEST PLAN

**TP 757.02**

---

### Rappel Step

**Bell 212, 412, 205A-1, 205B**

Revision 0  
13 May 2008

---

**AERO Design Ltd.**  
Engineering Consultants

2013 – 39<sup>th</sup> Avenue N.E., Calgary, Alberta T2E 6R7  
Phone: (403) 250-8027  
Fax: (403) 250-8333  
E-Mail: [info@aerodesign.ca](mailto:info@aerodesign.ca)

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## **1.0 INTRODUCTION**

This document tests the installation of the AERO Design rappel step onto an Apline Helicopters Bell 212.

## **2.0 REFERENCE**

Aero Design Ltd. Drawing 79801, Rappel Step Installation

Bell 212 Rotorcraft Flight Manual, BHT-212VFR-FM-1 (Current Revision)

## **3.0 BASIS OF CERTIFICATION**

Bell 412: FAR Part 29 dated 1 February 1965, Amendment 29-1 and 29-2

Bell 212: FAR Part 29 dated 1 February 1965, Amendment 29-1 and 29-2

Bell 205A-1: CAR 7 dated August 1, 1956, Amendments 7-1 through 7-4

Bell 205B: CAR 7 dated August 1, 1956, Amendments 7-1 through 7-4

This installation

Part 29 dated 1 February 1965, Amendment 29-1 and 29-2

This flight test programme will demonstrate that this installation complies with the flight requirements of the original basis of certification.

## 4.0 FLIGHT TEST PREPARATION

### 4.1 General

The flight crew should review and be familiar with the regulatory requirements of FAR29.251 *Vibration*, prior to conducting flight tests. These requirements are included as Appendix C.

The flight crew should examine and be familiar with the modification installed including a review of the proposed Flight Manual Supplement (if any).

The flight crew should always be attentive to unusual noises, vibrations, control characteristics, attitudes and instrument indications.

Altitude: The flight test shall be conducted below 1000 feet above sea level.

### 4.2 Configuration

Modification flight test

Rappel Step to be installed in accordance with AERO Design Ltd. Drawing 79801, Rappel Step Installation.

Those components of the modification which alter the external profile of the aircraft shall be installed in accordance with the applicable installation drawings.

Any other unusual or particularly large external modifications should be removed if practical and all external modifications installed during flight testing should be noted in the flight test report.

Weight: The gross weight of the aircraft shall be less than 7500lbs for this test.

#### 4.3 Flight Authority

The Certificate of Airworthiness may not be valid after the modification has been installed. Flight Authority in the form of a flight permit may be required.

Flight authority to exceed the published  $V_{ne}$  of the helicopter is required. When the  $V_{ne}$  for the modification as provided in the proposed Flight Manual Supplement does not restrict the maximum speed to less than 90% of the basic helicopter  $V_{ne}$  then, the flight permit should specifically state that a higher  $V_{ne}$  is authorized.

## 5.0 FLIGHT TEST PROCEDURE

### 5.1 Vibration

FAR29.251

#### **Low Speed (below 80 knots)**

From a hover, increase forward air speed to 80 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

#### **Forward 90 knots**

From 80 knots, increase forward air speed to 90 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

#### **Forward 100 knots**

From 90 knots, increase forward air speed to 100 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

#### **Forward 110 knots**

From 100 knots, increase forward air speed to 110 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

#### **Forward 120 knots**

From 110 knots, increase forward air speed to 120 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

#### **Forward 130 knots (Vne)**

From 120 knots, increase forward air speed to 130 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

#### **Forward 144 knots (Vd)**

From 130 knots, increase forward air speed to 144 knots in level flight.

Record: Observe and record any indications of flutter or vibrations.

## **APPENDIX A**

### **FLIGHT TEST REPORT**

**BELL 212**

Aircraft: C-FALK  
Serial no. 30982

Date: 14 May 2008  
Location: YYC and surrounding area

Configuration: \_\_\_\_\_  
No other external modifications installed on the aircraft.

Crew: Pilot: Mike Lequesne  
DAR: Ted Burgoon, Aero Design Ltd.

Flutter and Vibration

TEST	ACCEPTABLE	UNACCEPTABLE	COMMENTS:
LOW SPEED (BELOW 80 KNOTS)	yes		
FORWARD 90 KNOTS	yes		
FORWARD 100 KNOTS	yes		
FORWARD 110 KNOTS	yes		
FORWARD 120 KNOTS	yes		
FORWARD 130 KNOTS (Vne)	yes		
FORWARD 144 KNOTS (Vd)	yes.		

General Notes:

Pilot:

*Mike Lequesne* a324520

M. Lequesne

Date: 14 MAY 08

Witness:

E. Burgoine

Date: 14 MAY 08



**APPENDIX B****WEIGHT CALCULATIONS**

Weight for Flight Test

Date: \_\_\_\_\_

Rappel Step Installation

Bell 212

C-FALK, Serial No. 30982

Item	Weight (lbs.)	
Basic Helicopter	6533.5 lb 65341	CG 143.85 long, 0.19 Lat 143.84 to 0.28
Rappel Step Installation	_____	
Pilot	200	
Passenger	200 + fuel	
Fuel	800 lb	
Total Weight	_____	

Gross Weight Limit: \_\_\_\_\_ lb.

Helicopter refueled between flights to specified fuel condition.

**APPENDIX C****FAR 29 REQUIREMENTS****Federal Aviation Regulation****▼ Sec. 29.251**

Part 29 AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT	
Subpart B--Flight	Miscellaneous Flight Requirements

Sec. 29.251

Vibration.

Each part of the rotorcraft must be free from excessive vibration under each appropriate speed and power condition



Transport  
Canada  
Aviation

Transports  
Canada  
Aviation

Transport Canada Centre  
800 - 1601 Airport Road NE  
Calgary, Alberta  
T2E 6Z8

RACH 5008-FALK  
Tel: (403) 292-5019  
Fax: (403) 292-6709

Alpine Helicopters Ltd.  
1295 Industrial Rd  
Kelowna, BC, Canada  
V1Z 1G4

2008-05-14

**THIS CONSTITUTES A FLIGHT PERMIT (SPECIFIC PURPOSE) FOR AIRCRAFT:**

NATIONALITY AND REGISTRATION MARKS MARQUES DE NATIONALITÉ ET D'IMMATRICULATION	MANUFACTURER AND MODEL CONSTRUCTEUR ET MODÈLE	SERIAL NUMBER NUMÉRO DE SÉRIE
C-FALK	Bell 212	30982

**THIS FLIGHT PERMIT IS SUBJECT TO THE FOLLOWING OPERATING LIMITATIONS:**

1. Valid for 30 days from the date of issue or the completion of intended flight(s);
2. Local VFR test flights in accordance with Aero Design Ltd. Flight Test Plan TP 798.02 from Calgary International Airport (YYC), Calgary, AB Canada, with technical landings as required, for the purpose of showing compliance with airworthiness standards for the installation of a Rappel Step;
3. Essential flight crew members only - No Passengers;
4. No flights over built-up areas;
5. The aircraft shall be certified as safe and fit for the proposed flight by a qualified Aircraft Maintenance Engineer (AME) or other such authorized person, in the aircraft journey log book prior to the commencement of the flight;
6. Commercial use prohibited;
7. Ensure that all applicable airworthiness directives have been complied with;
8. Ensure that no airworthiness limitations are exceeded;
9. Permission of the foreign aviation authority required prior to flight in their airspace;
10. This document shall be carried on board the aircraft.

DATE: 2008-05-14

SIGNATURE: [Inspector] Mel Turgeon

For the Minister of Transport - Pour le ministre des Transports

Canada

**AERO DESIGN LTD.**2013 – 39<sup>th</sup> Ave N. E., Calgary, Alberta, T2E 6R7

aerodesign@telusplanet.net

**F A X C O V E R S H E E T**

DATE: May 14, 2008

TIME: 9:02 AM

TO: **Melvin Turgeon**

PHONE: (403) 292-5019

**Transport Canada – Calgary Office**

FAX: (403) 292-6709

FROM: **Richard Rathwell**

PHONE: (403) 250-8027

**Aero Design Ltd.**

FAX: (403) 250-8333

Number of pages including cover sheet: 2

**RE: APPLICATION FOR A FLIGHT PERMIT**

---

Melvin,

Attached is an application for a flight permit. The purpose for the flight is for the purpose of showing compliance with airworthiness standards for the installation of a rappel step on a Bell Medium (212, 412, 205A-1, 205B).

Due to contract requirements with our client, we require to conduct this flight test today.

Please call me if you have any questions.



Richard Rathwell

Print / Imprimer

Transport  
CanadaAPPLICATION FOR A  
FLIGHT PERMITDEMANDE DE  
PERMIS DE VOL

## INSTRUCTIONS

Print or type all entries. Reference Canadian Aviation Regulations Standard 507 for the use and disposition of the form.

Dactylographier ou écrire en lettres moulées. Consulte Règlement de l'aviation canadien norme 507 du Manuel de navigabilité qui précise la façon de remplir et d'acheminer le présent formulaire.

## A. AIRCRAFT IDENTIFICATION - IDENTIFICATION DE L'AÉRONEF

1. Owner - Propriétaire <b>ALPINE HELICOPTERS LTD</b>	3. Aircraft Manufacturer - Constructeur de l'aéronef <b>BELL</b>	4a. Model - Modèle <b>212</b>
2. Address - Adresse <b>1295 Industrial Rd Kelowna, British Columbia Canada, V1Z 1G4</b>	4b. Maximum Permissible Take-Off Weight Masse maximale admissible au décollage <b>► 5,080 Kg 11,200 lb</b>	
	5. Serial Number - Numéro de série <b>30982</b>	6. Nationality and Registration Marks Marques de nationalité et d'immatriculation <b>C-FALK</b>

## B. PURPOSE OF FLIGHT PERMIT (Check applicable boxes) - OBJECTIF DU PERMIS DE VOL (Cocher la ou les case(s) voulue(s))

- Ferry flights to a base for repairs or maintenance  
Un vol de convoyage vers une base en vue de réparation ou de maintenance
- Delivery, demonstration, market survey, or crew training flights  
Un vol de livraison, de démonstration, d'étude de marché ou d'entraînement d'équipage
- Flights for the purpose of showing compliance with airworthiness standards  
Un vol de démonstration de conformité aux normes de navigabilité
- Other purpose (Specify)  
Autre fin (Préciser)

C. FLIGHT DESCRIPTION AND AIRCRAFT LIMITATIONS  
Description of Flight(s) Use attachment when appropriateDESCRIPTION DU VOL ET LIMITATIONS DE L'AÉRONEF  
Description du ou des vol(s) Joindre une feuille au besoin

1. From - Aérodrome de départ <b>YYC - CALGARY, ALBERTA</b>	2. To - Aérodrome de destination <b>YYC - CALGARY, ALBERTA</b>	
3. Via - Escales <b>NIL</b>	4. Effective date (yyyy - mm - dd) Date effective (aaaa - mm - jj) <b>2008-05-14</b>	5. Termination date (aaaa - mm - dd) Date limite (aaaa - mm - jj) <b>2008-08-14</b>

## 6. Aircraft does not meet the applicable airworthiness requirements as follows:

Raisons pour lesquelles l'aéronef ne satisfait pas aux exigences de navigabilité en vigueur :

**RAPPEL STEP INSTALLATION IN ACCORDANCE WITH AERO DESIGN LTD. INSTALLATION DRAWING 79801.  
FLIGHT TO Vd (Vne X 1.1 = 144 KNOTS) TO BE APPROVED, IN ACCORDANCE WITH AERO DESIGN LTD.  
FLIGHT TEST PLAN TP798.02.**

## 7. The following maintenance conditions are considered necessary for safe operation:

Les conditions d'entretien suivantes sont nécessaires pour la conduite des vols en toute sécurité :

## LOG BOOK ENTRY BY QUALIFIED AME

## 8. The following operating conditions are considered necessary for safe operation:

Les conditions d'exploitation suivantes sont nécessaires pour la conduite des vols en toute sécurité :

**NO FLIGHT OVER BUILT-UP AREAS; VFR CONDITIONS; ESSENTIAL CREW ONLY; FLIGHT TO Vd (Vne X 1.1 = 144 KNOTS), IN ACCORDANCE WITH AERO DESIGN LTD. FLIGHT TEST PLAN TP798.02.**

## D. SIGNATURES

I hereby certify that the aircraft described above is in a condition for safe operation.  
Je, soussigné, certifie que l'aéronef décrit ci-dessus est en bon état de vol.

Signature, AME Licence No., ACA No. or RCA No.  
Signature, N° de licence de TAA, N° d'autorisation ou N° d'autorisation restreinte  
and - et

Signature of the Registered Owner or Authorized Representative  
Signature du propriétaire enregistré ou du représentant autorisé

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)

**2008 May 13**  
Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)

**AERO DESIGN LTD.**2013 – 39<sup>th</sup> Ave N. E., Calgary, Alberta, T2E 6R7

aerodesign@telusplanet.net

**F A X C O V E R S H E E T**

DATE: May 14, 2008

TIME: 8:20 AM

TO: **David McNab**

PHONE: (403) 292-5008

**Transport Canada – Calgary Office**

FAX: (403) 292-6709

FROM: **Richard Rathwell**

PHONE: (403) 250-8027

**Aero Design Ltd.**

FAX: (403) 250-8333

Number of pages including cover sheet: 2

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Richard Rathwell



Transport  
Canada

Transports  
Canada

APPLICATION FOR A  
FLIGHT PERMIT

DEMANDE DE  
PERMIS DE VOL

INSTRUCTIONS

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- Other purpose (Specify)  
Autre fin (Préciser)

C. FLIGHT DESCRIPTION AND AIRCRAFT LIMITATIONS  
Description of Flight(s) Use attachment when appropriate

DESCRIPTION DU VOL ET LIMITATIONS DE L'AÉRONEF  
Description du ou des vol(s) Joindre une feuille au besoin

1. From - Aérodrome de départ <b>YYC - CALGARY, ALBERTA</b>	2. To - Aérodrome de destination <b>YYC - CALGARY, ALBERTA</b>	
3. Via - Ecales <b>NIL</b>	4. Effective date (yyyy - mm - dd) Date effective (aaaa - mm - jj) <b>2008-05-14</b>	5. Termination date (aaaa - mm - dd) Date limite (aaaa - mm - jj) <b>2008-08-14</b>

6. Aircraft does not meet the applicable airworthiness requirements as follows:

Raisons pour lesquelles l'aéronef ne satisfait pas aux exigences de navigabilité en vigueur :

**RAPPEL STEP INSTALLATION IN ACCORDANCE WITH AERO DESIGN LTD. INSTALLATION DRAWING 79801.  
FLIGHT TO Vd (Vne X 1.1 = 144 KNOTS) TO BE APPROVED, IN ACCORDANCE WITH AERO DESIGN LTD.  
FLIGHT TEST PLAN TP798.02.**

7. The following maintenance conditions are considered necessary for safe operation:

Les conditions d'entretien suivantes sont nécessaires pour la conduite des vols en toute sécurité :

**LOG BOOK ENTRY BY QUALIFIED AME**

8. The following operating conditions are considered necessary for safe operation:

Les conditions d'exploitation suivantes sont nécessaires pour la conduite des vols en toute sécurité :

**NO FLIGHT OVER BUILT-UP AREAS; VFR CONDITIONS; ESSENTIAL CREW ONLY; FLIGHT TO Vd (Vne X 1.1 = 144 KNOTS), IN ACCORDANCE WITH AERO DESIGN LTD. FLIGHT TEST PLAN TP798.02.**

D. SIGNATURES

I hereby certify that the aircraft described above is in a condition for safe operation.  
Je, soussigné, certifie que l'aéronef décrit ci-dessus est en bon état de vol.

*John Moore ACA-30*

Signature, AME Licence No., ACA No. or RCA No.  
Signature, N° de licence de TEA, N° d'autorisation ou N° d'autorisation restreinte  
and - et  
*John Moore*

Signature of the Registered Owner or Authorized Representative  
Signature du propriétaire enregistré ou du représentant autorisé

*2008 May 13*

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)

*2008 May 13*

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)



APPLICATION FOR A  
FLIGHT PERMIT

DEMANDE DE  
PERMIS DE VOL

INSTRUCTIONS

Print or type all entries. Reference *Canadian Aviation Regulations Standard 507* for the use and disposition of the form.

Dactylographier ou écrire en lettres moulées. Consulte *Règlement de l'aviation canadien norme 507* du Manuel de navigabilité qui précise la façon de remplir et d'acheminer le présent formulaire.

**A. AIRCRAFT IDENTIFICATION - IDENTIFICATION DE L'AÉRONEF**

1. Owner - Propriétaire <b>ALPINE HELICOPTERS LTD</b>	3. Aircraft Manufacturer - Constructeur de l'aéronef <b>BELL</b>	4a. Model - Modèle <b>212</b>
2. Address - Adresse 1295 Industrial Rd Kelowna, British Columbia Canada, V1Z 1G4	4b. Maximum Permissible Take-Off Weight Masse maximale admissible au décollage ► <b>5,080</b> Kg <b>11,200</b> lb	5. Serial Number - Numéro de série <b>30982</b>
		6. Nationality and Registration Marks Marques de nationalité et d'immatriculation <b>C-FALK</b>

**B. PURPOSE OF FLIGHT PERMIT (Check applicable boxes) - OBJECTIF DU PERMIS DE VOL (Cocher la ou les case(s) voulue(s))**

- Ferry flights to a base for repairs or maintenance  
Un vol de convoyage vers une base en vue de réparation ou de maintenance
- Delivery, demonstration, market survey, or crew training flights  
Un vol de livraison, de démonstration, d'étude de marché ou d'entraînement d'équipage
- Flights for the purpose of showing compliance with airworthiness standards  
Un vol de démonstration de conformité aux normes de navigabilité
- Other purpose (Specify)  
Autre fin (Préciser)

**C. FLIGHT DESCRIPTION AND AIRCRAFT LIMITATIONS**

**Description of Flight(s) Use attachment when appropriate**

**DESCRIPTION DU VOL ET LIMITATIONS DE L'AÉRONEF**

**Description du ou des vol(s) Joindre une feuille au besoin**

1. From - Aérodrome de départ <b>YYC - CALGARY, ALBERTA</b>	2. To - Aérodrome de destination <b>YYC - CALGARY, ALBERTA</b>	
3. Via - Escales <b>NIL</b>	4. Effective date (yyyy - mm - dd) Date effective (aaaa - mm - jj) <b>2008-05-14</b>	5. Termination date (aaaa - mm - dd) Date limite (aaaa - mm - jj) <b>2008-08-14</b>

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Signature, AME Licence No., ACA No. or RCA No.  
Signature, N° de licence de TEA, N° d'autorisation ou N° d'autorisation restreinte  
and - et

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)

Signature of the Registered Owner or Authorized Representative  
Signature du propriétaire enregistré ou du représentant autorisé

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)



Transport  
Canada

Transports  
Canada

APPLICATION FOR A  
FLIGHT PERMIT

DEMANDE DE  
PERMIS DE VOL

INSTRUCTIONS

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Dactylographier ou écrire en lettres moulées. Consulte Règlement de l'aviation canadien norme 507 du Manuel de navigabilité qui précise la façon de remplir et d'acheminer le présent formulaire.

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Un vol de démonstration de conformité aux normes de navigabilité
- Other purpose (Specify)  
Autre fin (Prévoir)

C. FLIGHT DESCRIPTION AND AIRCRAFT LIMITATIONS  
Description of Flight(s) Use attachment when appropriate

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and - et

Signature of the Registered Owner or Authorized Representative  
Signature du propriétaire enregistré ou du représentant autorisé

*2008 May 13*

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)

*2008 May 13*

Date (yyyy - mm - dd)  
Date (aaaa - mm - jj)

704 (403) 250 - 8333

**Barry Newman**

**From:** Richard Rathwell [richard@aerodesign.ca]  
**Sent:** May 13, 2008 8:23 AM  
**To:** 'Barry Newman'  
**Subject:** JOB 798 - Rappel Step - Flight Test

Barry,

For the rappel step flight test, we require the following;

- a. Reg. and s/n of the helicopter to be used. C-FALK S/N 30982
- b. Weight and CG of the helicopter, 6533.5 lbs 143.85 c/g + .19 lateral
- c. Date available for testing. 14 May 08
- d. The name and contact info of the local AME to sign off the installation, and Mike Leguesne
- e. The name of the pilot. Mike Leguesne (403) 815-5968

Thanks,

Richard

→ crnd. ✓

## CONFORMITY INSPECTION RECORD

### APPLICANT'S ATTESTATION

I hereby confirm that the prototype installation for the subject

- MODIFICATION,
- REPAIR,
- TSO/AP-TC ARTICLE

is in conformity with the applicable installation drawing(s) listed above and that necessary ground tests have been carried out.  
[Please check (✓) the applicable box.]

## TC INSPECTION

ACCEPTABLE  
 UNACCEPTABLE

Additional Information:

Remarks:

Signature: *Nikunj Patel* Ac-30

Signature:

# AIRWORTHINESS NOTICE B043 EDITION 2, dated 28 January 2000

## **CONFORMITY INSPECTION ASSOCIATED WITH APPLIANCE TYPE CERTIFICATION OR MODIFICATION/REPAIR APPROVAL PROJECTS**

*(This Airworthiness Notice supersedes AN No. B043 Edition 1, dated 24 April 1998.)*

### **Purpose**

The purpose of this notice is to explain the responsibilities of an applicant prior to requesting a conformity inspection associated with the prototype evaluation of a supplemental type certificate (STC), a limited supplemental type certificate (L/STC), a repair design certificate (RDC), a TSO and/or an appliance type certificate (AP-TC) installation. This revision is intended to clarify the qualifications for those persons responsible for the conformity inspections.

### **Background**

In several cases, prototype installations have not been performed in accordance with the applicant's installation drawings nor have the necessary ground tests been conducted, where required, prior to seeking a conformity inspection by Transport Canada (TC). This situation may often result in ineffective use of TC resources.

### **Conformity Requirements (Prototype Installation)**

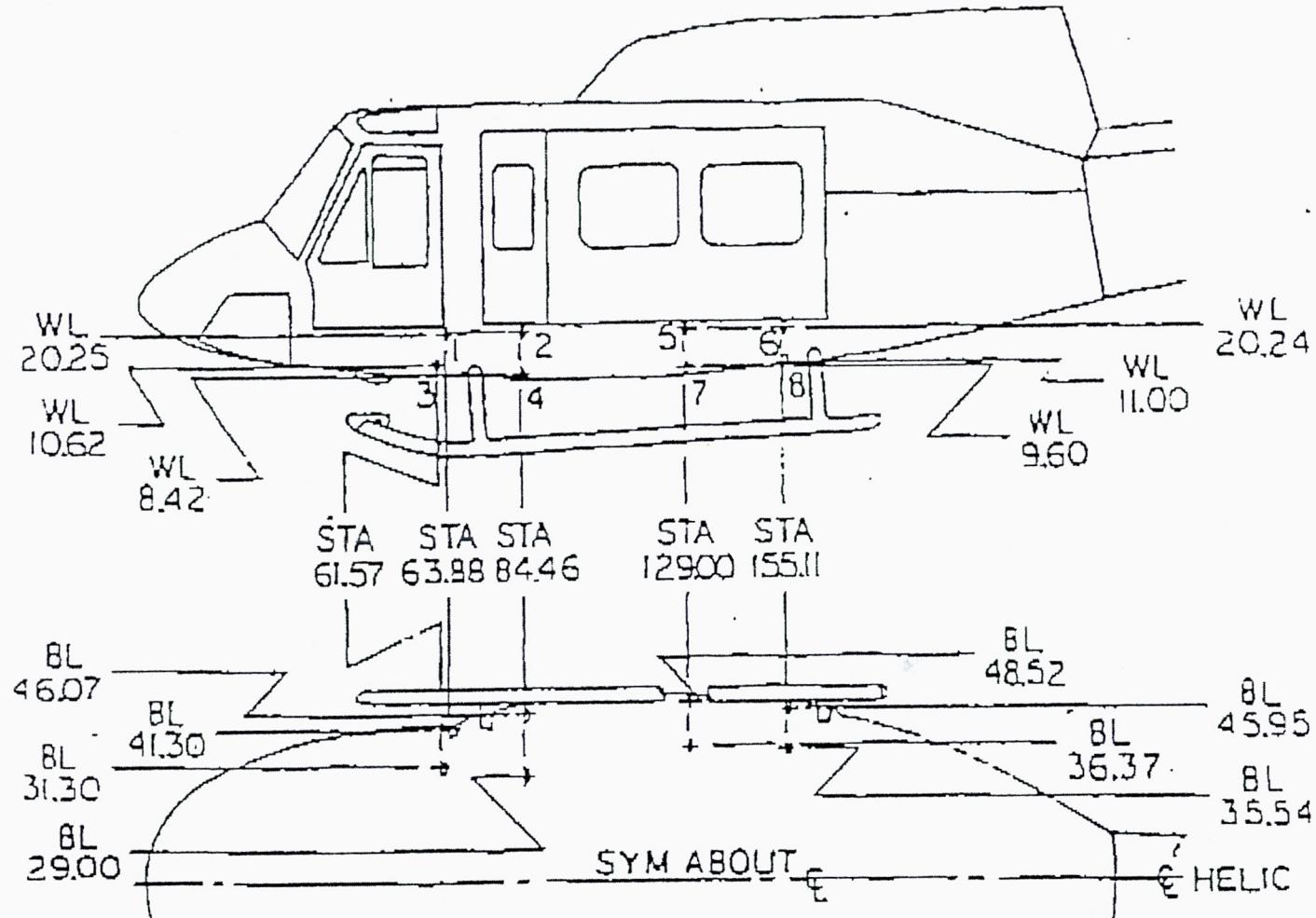
The need for a conformity inspection by Transport Canada on a prototype installation associated with an STC, L/STC, RDC, AP-TC or TSO design approval project will be determined by the regional engineer responsible for the project, and the applicant will be advised accordingly. Where such a requirement has been identified, the prototype installation is to be verified by the applicant or his designated person for conformity with the applicable installation drawings and, where required, ground tests performed to determine functionality. The above functions are to be carried out prior to the applicant requesting the required conformity inspection by TC representatives.

### **Confirmation**

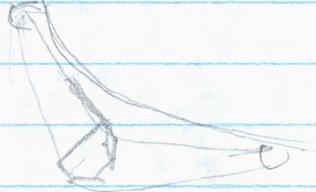
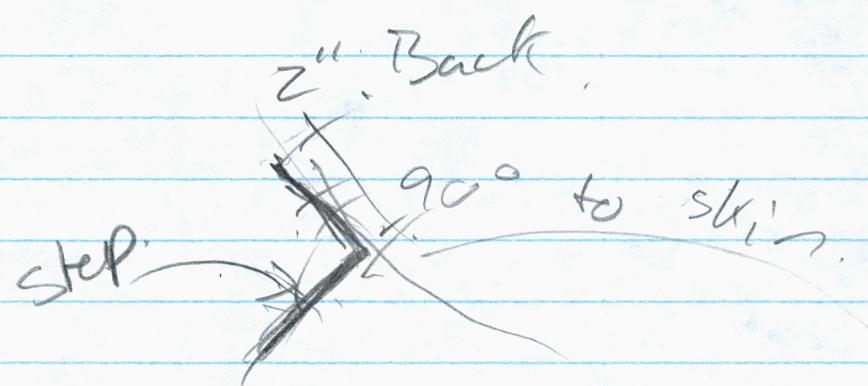
A written confirmation is to be provided to the responsible regional project engineer using the Conformity Inspection Record form appended to this notice, or an equivalent form acceptable to TC. The completed form is to be signed by an appropriately rated Aircraft Maintenance Engineer (AME) or Approved Maintenance Organization (AMO). TC form 24-0045 (Conformity Certificate - Repair or Modification), which is intended to certify the installation of an approved modification or repair, should not be used as a Conformity Inspection Record. The Conformity Inspection Record should be accompanied by details pertaining to the location of the test article, the proposed modification or repair, and a proposed date for accomplishing the conformity inspection by TC Airworthiness Inspectors.

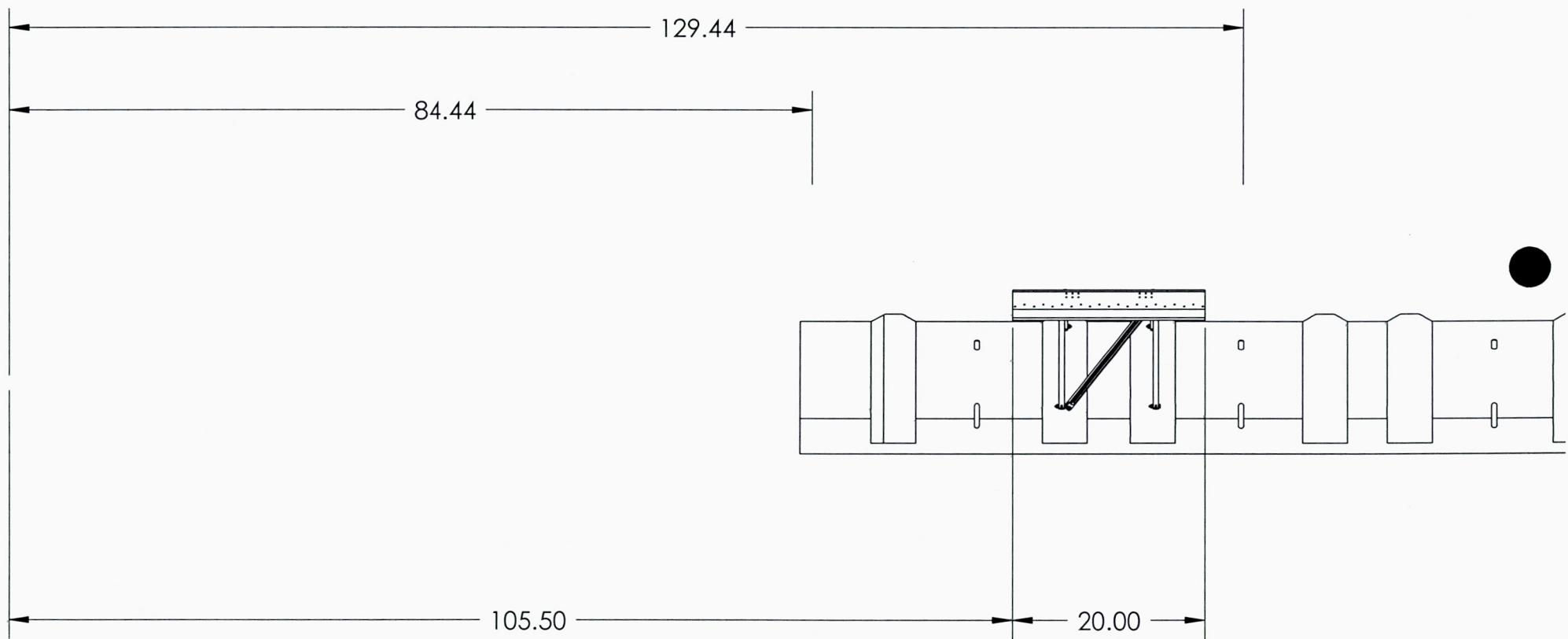
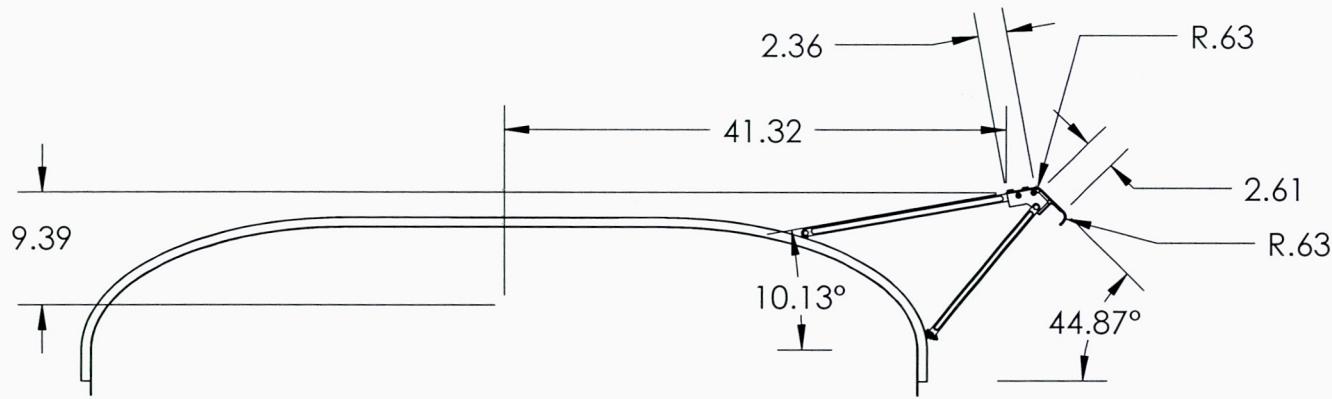
# EXTERNAL HARPOUNERS: MODELS 205, 212, 214B & 412

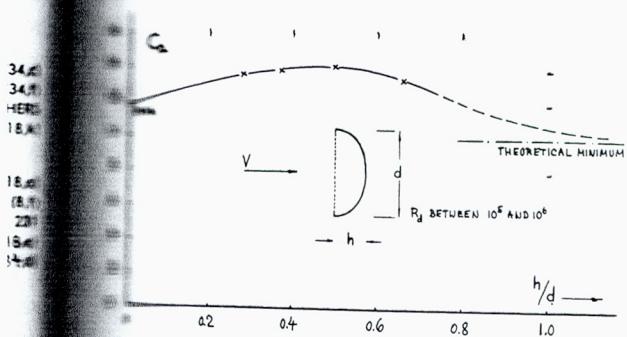
## FUSELAGE LOCATIONS AND ALLOWABLE ULTIMATE LOADS



CAUTION: Helicopter C.G. limits must be maintained for all equipment or stores configurations which attach to any or all of these hardpoints.







Drag coefficient of sheet-metal "caps" (40,a) as a function of their height ratio.

*and Cups.* As large as the drag coefficients of plates may be, there are other shapes exhibiting still larger values. Figure 31 shows the drag coefficient of open cup- or cap-like bodies (similar to para-canopies). The maximum drag coefficient (on projected area) is obtained for  $h/d$  in the order of a shape which is  $\approx$  hemispherical. Upon further increasing the height ratio, the rear side more and more changes into a wake "fairing". The drag coefficient is, therefore, expected to approach the theoretical minimum which corresponds to full stagnation pressure across the opening.

Figure 32 (near). Drag coefficients of various 3-dimensional bodies (40) at  $R'$  numbers between  $10^4$  and  $10^6$ . Note: (•) tested on wind-tunnel floor.

Information on rear-side pressure of plates: for disks and small-aspect-ratio plates see: NACA (36, Ergebnisse IV; reference (40,f)). For plates between walls see: (12), (35,a) and (40,f). Experimental results on three-dimensional bodies: French, Parachute Models, Lufo 1938 p.577. A. Cup Anemometer, Tech Rpt 513 (1935). B. Hemispherical Bodies, Ergebnisse IV (1932). C. Recherches a Tour Eiffel, Paris 1907. D. Hemispherical Cup at  $R_d = 2 \cdot 10^5$ , ARC RM 712 (1919). E. and Nokkentved, Elementary Bodies and Plates, Copenhagen 1930 and 1936; Transl'n by Jarvis. F. Sections (tested between plates or walls): (a) Simple Shapes, NACA T. Rpt 619 (1940). (b) Wind-Tunnel, Report Ströte V.9609 (1940). (c) Difference Between Struts, NACA T. Rpt 468 (1933). (d) Sorensen, Various Shapes, NACA T. Note 3038. (e) Göttingen, Ergebnisse II (1923) and III (1926). (f) Wind-Tunnel Result on Angle Profile. (g) Reported by Barth, Zt. Flugwissen 1954 p.309. G. Free-streamline (cavitation) theory: (a) Bernoulli, Free Jet Theory, Crelle 1869 (see Lamb). (b) Bernoulli, Russian Phys.-Chem. Society 1881 (see Lamb). (c) Joukowsky-Plesset-Schafer, Journal Appl. Physics 1948 and Review Modern Physics 1948 p.228. (d) Prandtl, Laws of Cavities, German ZWB UM 6628. (e) Neef, Dive Brakes, Fieseler Tunnel Rpt 22 (1941).

## 7. DRAG OF WEDGES AND CONES

Figures 32 and 33 present shape and drag coefficient of a number of three- and two-dimensional bodies. All of these shapes have a more or less separated flow pattern; most of them have negative pressure on their rear side; and their drag coefficients are comparatively high.

*Angle of Flow.* To establish some order in the drag coefficients of various shapes, the geometrical angle is very useful, at which the flow is guided by the body's surface upon separating from its rear side. The flat plate, for example, has such an angle " $\varepsilon$ " =  $90^\circ$ . A "fold" with a vertex angle of two times  $45^\circ$ , has a separation angle of  $90^\circ$  plus or minus  $45^\circ$ , depending upon the direction of the oncoming flow. Figure 34 demonstrates how the drag coefficient increases as a function of the shape angle. Two branches are found, of course; one for two-dimensional bodies (between walls) and another one for three-dimensional conditions. At " $\varepsilon$ " = 0, parallel-sided round-nosed shapes have been used in the graph; a hallow, scoop-like body is plotted at  $180^\circ$ .

Figure 33 (right). Drag coefficients (41) of 2-dimensional shapes (between walls) at  $R'$  between  $10^4$  and  $10^6$ . Note: (+) in subcritical flow.

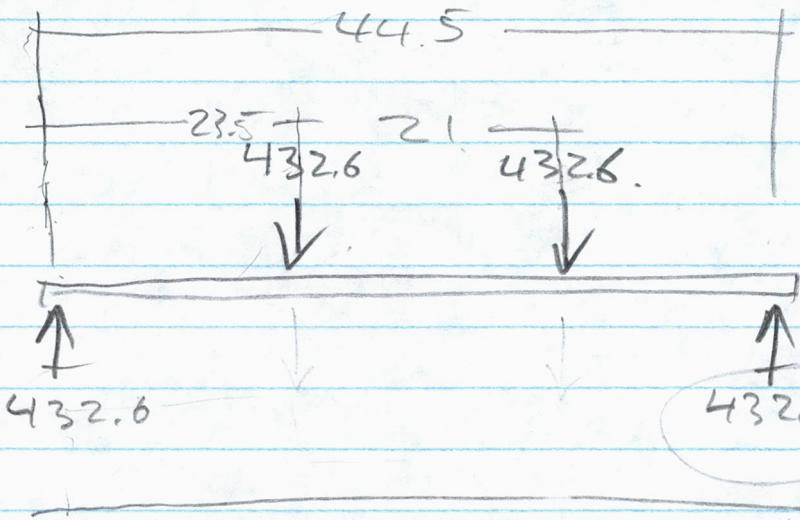
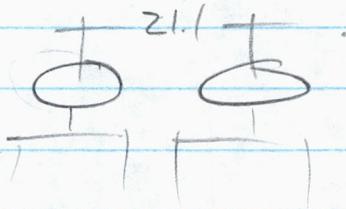
SHAPE	REF.	$C_d$
STING SUPPORT	(a)	0.47
(c)	0.38	
(c)	0.42	
(e)	0.59	
CUBE	(f)	0.80
$-60^\circ$	(d)	0.50
SEPARATION		1.17
(c)	1.17	
(b)	1.42	
(a)	1.38	
(f)	1.05	
—	(a)	1.17
(a)	1.20	
(g)	1.16	
(d)	1.60	
(e)	1.55	
(a)	1.55	
VORTEX STREET		1.98
(a)	2.00	
(a)	2.30	
(b)	2.20	
CUBE	(a)	2.05

1629

w Analysis for persons using the step to enter the  
798 Eng. aircraft.

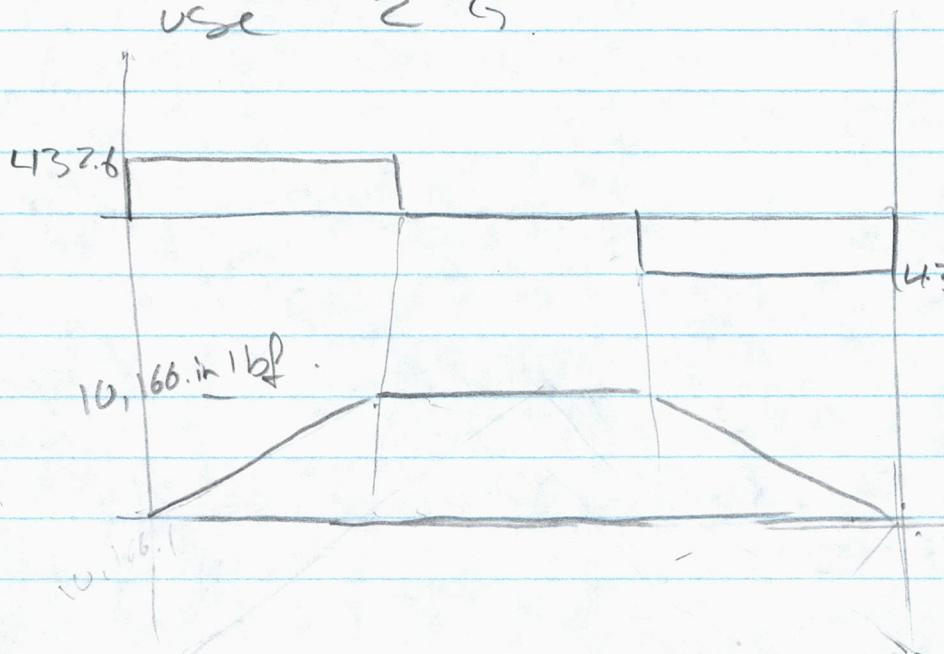
Bending

w assumption  $2 \times 95^{\text{th}}$  percentile males.  
wt. per person  $216.3 \text{ lbf}$ .



$2 \times \text{AN 4 Bolts}$   
 $@ 3600 \text{ lbf.}$   
single shear

No regulation for load.  
use  $2 G$



$$I_x = 0.63$$

$$c = 1.25$$

$$432.6$$

$$\frac{MC}{I} = \frac{10,166 \text{ in} \times 1.25 \text{ in.}}{0.63 \text{ in.}^4}$$

$$= 20,170 \text{ psi}$$

$$6081-73 > 20 \text{ ksi}$$

TO: RICHARD  
FROM: MIKE @ ALPINE HELICOPTERS  
1 PAGE TO FOLLOW.

05/13/2008 13:20 FAX 1 250 769 2040

ALPINE HELICOPTERS

001/002



**Alpine**  
HELICOPTERS LTD.

1295 Industrial Road  
Kelowna, British Columbia  
Canada V1Z 1G4  
Telephone: (250) 769-4111  
Facsimile: (250) 769-2040

TO:

Richard

DATE:

FROM:

Scary

FAX NO.:

NO.OF PAGES TO FOLLOW:

Please forward Weight Station of  
steps for WTS amendments for log book  
entry.

Thanks

Scary

Long

CG G.

798

wt	str.(in)	Moment.
----	----------	---------

Step	6.9 lb	406.73.
------	--------	---------

Fuel.	1.6 lb	84.46
-------	--------	-------

AFL	1.0 lb	129.00.
-----	--------	---------

		<u>129.00</u>
		999.58/
		9.5 lb

$$\frac{Str}{CG} = 105.82 \text{ in}$$

BL

wt.	(in)	Moment
-----	------	--------

Step	6.9 lb	46.06.
------	--------	--------

Fuel	1.6 lb	41.82
------	--------	-------

AFL	1.0 lb	44.47
-----	--------	-------

		<u>44.47</u>
		429.20
		<u>9.5 lb</u>

37.012

473.48

87.74

84 - BL 46.07

129 34 48.52

3.28

6.03

$$\frac{BL}{CG} = 45.18 \text{ in}$$

digital scale:

Transport  
CanadaTransports  
CanadaFrançais  
Home  
AirContact Us  
About us  
MarineHelp  
Media room  
RailSearch  
Environment  
RoadCanada Site  
Emergencies  
Major issues

Canada

*Employee Directory*

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- [A to Z index](#)
- [Site map](#)
- [Our offices](#)

Mini Search



## Employee Directory

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- [About this Directory](#)
- [Government of Canada Phone Directory](#)

## Employee Information

**Name:** David McNab  
**Phone:** (403) 292-5008  
**Position:** Superintendent, Maintenance and Manufacturing  
**X400:** c=CA;a=GOVMT.CANADA;p=GC+TC;s=McNab;g=David;  
**Internet:** mcnabd@tc.gc.ca  
**Routing Symbol:** RACH  
**Building:** Calgary, Airport Corporate Centre  
**Address:** 800-1601 Airport Road N-E  
**City:** Calgary  
**Province:** Alberta  
**Postal Code:** T2E 6Z8

## Organization Information

**Organization:** Aircraft Maintenance and Manufacturing - Calgary  
**Address:** Calgary, Airport Corporate Centre 800-1601 Airport Road N-E  
**City:** Calgary  
**Province:** Alberta  
**Postal Code:** T2E 6Z8  
**Fax:** (403) 292-6709

[Organizational Structure](#)

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